EFFECTIVENESS OF DISTILLED VINEGAR USED TO DISINFECT URINARY DRAINAGE BAG ON LEVEL OF BACTERIURIA AMONG URINARY CATHETERIZED PATIENTS AT SELECTED HOSPITAL, KANYA KUMARI

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CERTIFICATE

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CHAPTER- I

INTRODUCTION

Infection Control - Are You In?

Get Involved, Provide Input, Initiate Change!

-National Resource for Infection Control

Urinary Tract Infection is one of the most common nosocomial infection and the most frequent predisposing factor in 80% of the patients **(Shoba K.L, 2008)**.

Urinary Tract Infections are caused by pathogenic microorganisms in the urinary tract. Urinary Tract Infection is the second most common reason patients seek health. Most cases occur in women. One out of every five women in US will develop a Urinary Tract Infection. The Urinary Tract is the most common site of nosocomial infection accounting for greater than 40% of the total number reported by hospitals and affecting about 6,00,000 patient each year **(Porth, 2005)**

Urinary Tract Infection is a bacterial infection that affects any part of the urinary tract. Symptoms include frequent feeling and need to urinate, pain during urination, and cloudy urine. The main causal agent is Escherichia coli. Although urine contains a variety of fluids, salts, and waste products, it does not usually have bacteria in it. When bacteria get into the bladder or kidney, they multiply in the urine and cause Urinary Tract Infection.

Antiseptic solutions are used in cleansing the urobag. Distilled vinegar which has an bacteriostatic effect can be used in treating urobag as a measure to prevent bacterial Infection **(Washinton EA, 2001)**

Bacteriuria is generally defined as more than 1,00,000 colonies of bacteria per millilitre of urine. In a large scale study, prevalence of organism of patients with Urinary Tract Infection in both community and hospital found that bacteria were responsible for 54.7% of Urinary Tract Infection. It's more common in patients with Indwelling Urinary Catheters **(Porth, 2005)**

Urinary tract infection is an important cause of morbidity and mortality in Indian subjects, affecting all age groups across the life span. Escherichia Coli, which is normally present in the gastrointestinal tract, is the commonest causative organism. Other gram negative colonic bacteria have also been gaining prominence in India over the last two decades. It was noticed that the incidence of Urinary Tract Infection was 36.3 % in hospitalised patients and 16.5% in a non-hospitalised outpatient population group.

Up to 25% of hospitalized patients undergo Urinary Catheterization about 5% develop bacteriuria on each day of catheterization. Catheter-related bacteriuria is associated with increased morbidity and mortality. An evidence-based synthesis of the literature on preventing catheter-associated urinary tract infection was, to develop recommendations for clinicians. Catheterization should be avoided when not required, and should be terminated as soon as possible. Use of suprapubic and condom catheters may be associated with a lower risk of Urinary Tract Infection than use of urethral catheters. Aseptic catheter insertion and a properly maintained closed drainage system are crucial to reducing the risk of bacteriuria. Instillation of antimicrobial agents into the bladder or urinary drainage bag and rigorous urethral meatus cleansing seems to be of little benefit **(Sanjay Saint,1999)**

Several complications arise in Urinary Catheterized patients. The complications in short term catheterized patient include fever, acute pyelonephritis, Bacteremia and death. Patients with long term catheters in place are at risk for these complications like Catheter Obstruction, Urinary Tract stones, Local periurinary Infections, Chronic renal inflammation, Chronic Pyelonephritis, and over years Bladder cancer. So great emphasize should be given to care of Catheterization **(Warren J,1997)**

Indwelling catheters are strongly associated with the development of bacteriuria, which can lead to significant morbidity in hospitalized patients. This literature evaluates the infectious outcomes of patients with indwelling catheters to determine the precise clinical and economic impact of catheter-related infection. Of patients who have indwelling catheters for 2 to 10 days, 26% of patients expected to develop Bacteriuria. Among patients with bacteriuria symptoms of urinary tract infection will develop in 24%, and bacteremia from a urinary tract source will develop in 3.6%. Infection control professionals and hospital epidemiologists should use the infection control principles and technologies to reduce this common complication **(Saint.S, 2000).**

Healthcare Infection Control Practices Advisory Committee, (2009) conducted a broad survey in US hospitals, and found that urinary tract infections made up the highest number of infections (> 560,000) compared to other Hospital Acquired Infection's, and attributable deaths from Urinary Tract Infection were estimated to be over 13,000 (mortality rate 2.3%). And while fewer than 5% of bacteriuric cases develop bacteremia, and is the leading cause of secondary nosocomial bloodstream infections. About 17% of hospital-acquired bacteremias are from a urinary source, with an associated

mortality of approximately 10%. In the nursing home setting, bacteremias are most commonly caused by Urinary Tract Infections, the majority of which are catheter related.

Urobag is an excellent medium of micro organism growth. Bacteria can travel up drainage tubing to grow in pools of urine. If this urine flows back into the clients bladder an infection will likely develop. **(Kunnin, 2001)**

"Using vinegar as a disinfectant

Is the original GREEN way to clean"

NEED FOR THE STUDY

Urinary Tract Infections as one of the most common nosocomial infection which pose a considerable financial burden. A study was conducted on the basic of nosocomial Infection in the ICU, which shows. The rate of nosocomal infection was 27.4%. Of that the rate of catheter related infection was 55.62% which is the highest rate comparing to the other Hospital acquired Infection.(**Shalini S, GopalaKrishna Batt, 2010).**

Nosocomial Urinary Catheter may increase the mortality rate up to three times. In most of the Hospital Acquired Infection 45% are due to UTI. In United kingdom, 5000 death out of 1,00,000 patient are due to Bacteriuria.

A lot of preventive measures have been tried in order to decrease the incidence of catheter-related bacteriuria and its related complications. The instillations of disinfectants were used with different success rates to prevent cross-contamination.

Approximately 4 million Americans undergo urinary catheterization annually, and more than 5, 00,000 of these catheterizations involve indwelling catheters left in place for some period**.** Between 15% and 25% of patients may receive indwelling catheters during hospitalization, and the prevalence of catheter use in residents of long-term care facilities is estimated between 7.5% and 10% **.** Out of 4,010 individuals receiving home care services, 4.5% used an indwelling urinary catheter. **Sorbye et al, (2005).**

Particular attention must be paid to the most likely complication associated with catheter use. Catheter Associated Urinary Tract Infection is currently one of the most common infections and comprises 40% of all institutionally acquired infections. In the home setting, Catheter Associated Urinary Tract Infections occur in 8% of patients. The daily risk of developing Catheter Associated Urinary Tract Infection ranges from 3% to 7% and cumulatively increases the longer the catheter remains in place. After 30 days of indwelling catheterization, bacteriuria, bacteria in the urine, will be present in virtually 100% of patients. In addition, bacteremia, a serious and potentially life-threatening complication, will develop in approximately 3% of all catheterized patients. Using infection control measures, an estimated 17% to 69% of Catheter Associated Urinary Tract Infections may be prevented **(Association for Professionals in Infection Control and Epidemiology, 2008).**

A lot of preventive measures have been tried, in order to decrease the incidence of catheter-related bacteriuria and its related complications. The instillations of disinfectants were used with different success rates to prevent cross-contamination. In a study, researcher tried to kill common urinary pathogens in contaminated urinary bags with an electrical current with the objective of establishing an alternative modality so as to decrease the incidence of nosocomial urinary tract infections, but it is of high cost. **(World Journal of Urology, 2002).**

As catheterization poses serious risks, the method of bladder drainage should not be considered until all other interventions have been assessed as inappropriate or deemed unsuccessful. When patients require catheterization, intermittent catheters should be considered first. To minimize the complications associated with catheterization,

healthcare interventions, supported by best practice evidence should be implemented by all practitioners involved in catheter care. **(Healthcare Infection Control Practices Advisory Committee, 2009).**

The risk of bacteriuria from a single catheterization of the bladder is conservatively quoted at 3-4%. With an indwelling catheter the incidence of bacteriuria is directly related to the length of catheterization and it varies from 5% to 10% per day catheterization .Though the majority of this is asymptomatic bacteriuria, it may progress to symptomatic Urinary Tract Infection in 10-30% of patient.

Stamm and Norby, (2001) stated that Urinary Tract Infection are at times difficult to diagnose; some cases respond to a short course of antibiotic, while other require a long course of broad spectrum antibiotic. Treatment of Urinary Tract Infection is essential to limit its associated morbidity and mortality and avoid prolonged use of antibiotics. The introduction of new antimicrobial agents has allowed the care givers to tailor specific treatment.

Only a few studies have been done with Poisoned- Iodine solution, Savlon solution, Hydrogen per oxide etc on level of bacteriuria.

Narayani Karthik, (2010) stated that Distilled vinegar health benefits are many, as it has antibacterial properties. On medical grounds, distilled vinegar is an effective treatment for toe nail fungus, nose bleeds, nausea, nasal congestion, and muscle cramps and athletes foot. Even the ancient Romans had used vinegar as a natural disinfectant, mostly for disinfecting drinking water. Several diseases during middle ages were

prevented from spreading by the use of vinegar. No other chemical disinfectant has these properties, and can eliminate micro organisms and germs due to its anti microbial abilities. E coli can even be eliminated with the use of vinegar.

Vinegar is of less cost comparing to other antiseptic solution and thus it reduce the financial burden and can also be used in home setting with chronic catheterized patients. Even with meticulous care, this system will not prevent bacteriuria. After bacteriuria develops, the ability to limit its complication is minimal.

Thus the study helps to reduce the level of bacteriuria on Urinary Drainage bag in clinical practice.

STATEMENT OF THE PROBLEM

A Study to evaluate the effectiveness of Distilled vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients at selected hospital in KanyaKumari district.

OBJECTIVES

- To assess the level of bacteriuria among Urinary Catheterized patients after disinfecting with distilled vinegar among experimental group.
- To assess the level of bacteriuria among urinary catheterized patients in control group
- To evaluate the effectiveness of Distilled Vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients.
- To associate the level of bacteriuria with selected demographic variables of experimental group.
- To associate the level of bacteriuria with selected demographic variables of control group.

HYPOTHESIS

$H_{1:}$ There will be a significant difference in the level of bacteriuria among Urinary Catheterized patients between experimental and control group at $P<0.05$ level of significance.

$H_{2:}$ There will be a significant association between the level of bacteriuria and selected demographic variables of experimental group at $P< 0.05$ level of significance.

$H_{3:}$ There will be a significant association between the level of baceriuria and the selected demographic variables of conrol group at $P<0.05$ level of significance.

OPERATIONAL DEFINITIONS

Effectiveness

It refers to the outcome of Distilled Vinegar in reducing the level of bacteriuria among Urinary catheterized patients as measured by Clinical signs and symptoms of Bacteriuria, urine analysis and culture.

Distilled Vinegar

It is a Bacteriostatic liquid with two parts of vinegar and three parts of water which is used to disinfect urinary drainage bag everyday for five consecutive days among urinary catheterized patients.

Bacteriuria

It is the rate of bacteria at more than 1, 00,000 colonies of bacteria per millilitre of urine collected after five days of Urinary Catheterized patients.

Urinary Catheterized Patients

Patients who are catheterized and will remain on Continuous Bladder Drainage for five days or more

ASSUMPTIONS

1. The level of bacteriuria may be more among Urinary Catheterized patients.
2. The level of Bacteriuria may differ between male and female.

DELIMITATIONS:

1. The data collection period was limited to four weeks.
2. The study was limited only to Urinary Catheterized patients between 20-80yrs of age.

CONCEPTUAL FRAMEWORK

A conceptual frame work conveys the general meaning of the concept and reflects the theory used in this study of that concept. This framework is composed of all the extraneous factors and facilities that affect the nurse's ability to obtain the desired results.

Wiedenbach's views nursing practice is an art in which the nursing action is based on the principles of helping. Nursing practice as a discipline is goal directed. The nature of the nursing act is based on thought. The nurse thinks through the kind of results she wants, fears her action to obtain those results, then accepts the responsibility for the acts and the outcome of those acts. According to her, Knowledge, Judgement and Skill are necessary for effective nursing practice.

Nursing practice has three components

1. Identification of patients need for help.
2. Ministration of the needed help
3. Validation of the action taken was helpful to the patient.

IDENTIFICATION

Identification involves individualization of the patient, his experiences, and recognition of the patients perception of his condition.

In this study it involves determining the need for help. The researcher identifies the patients with Indwelling Urinary Catheter who need the disinfection of Urinary Drainage Bag. The researcher assessed the existing urinary drainage bag, and the importance given for urinary drainage bag disinfection.

MINISTRATION

Ministration refers to the provision of needed help and plan of care. It requires the identification of the need for help, the selection of a helping measure appropriate to that need, and the acceptability of the help to the patient. In this the researcher presents her plan by disinfecting the urinary drainage bag with distilled vinegar to the experimental group and no wash is provided to the control group.

VALIDATION

In the validation, collecting the evidences shows whether the patient's functional ability was restored as a result of the help given. In this study the evaluation of the effectiveness of distilled vinegar in urinary drainage bag disinfection is evidenced by the level of bacteriuria. The validation was done by assessing the clinical signs and symptoms of bacteriruia.

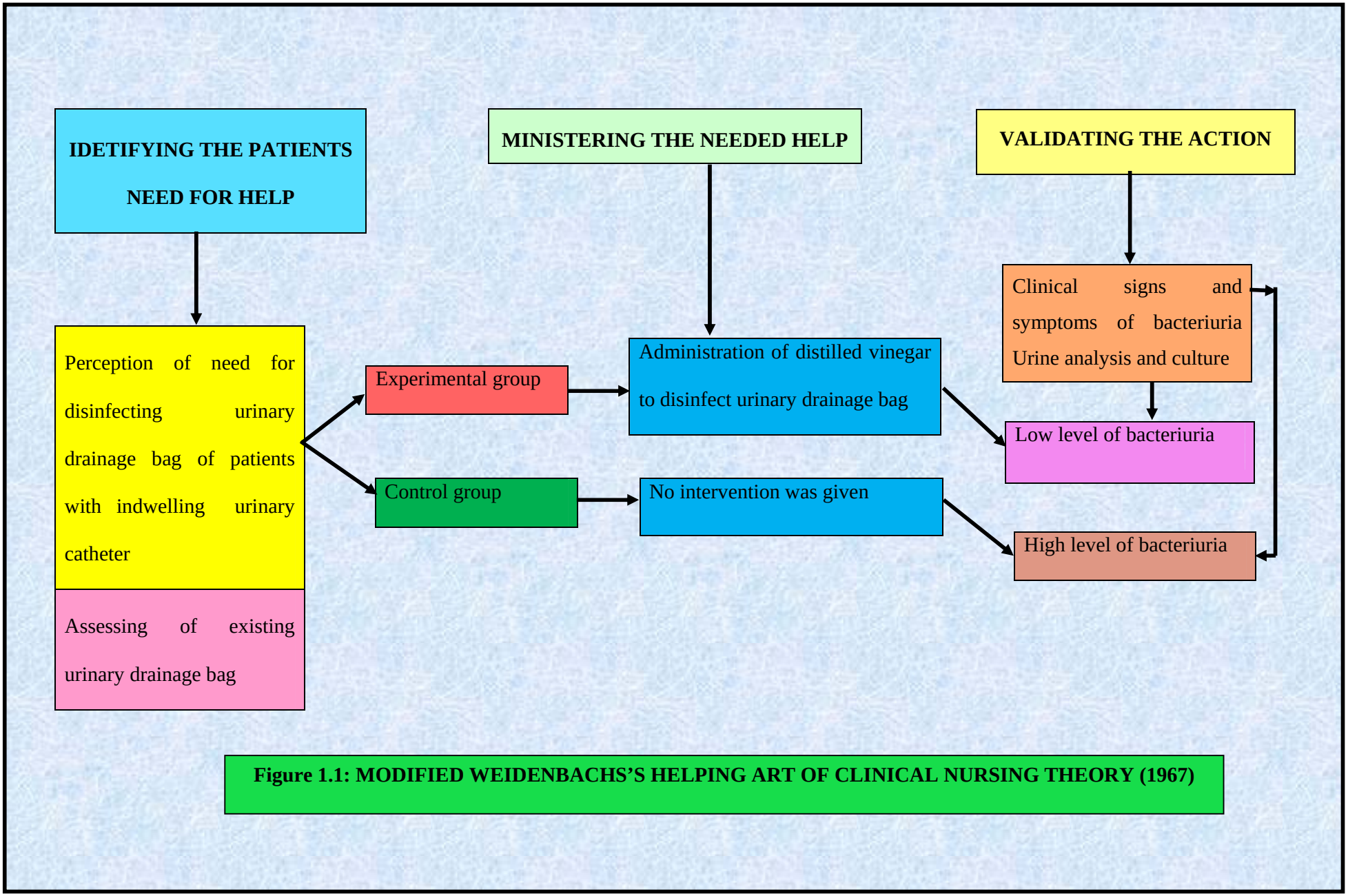

Figure 1.1: MODIFIED WEIDENBACHS'S HELPING ART OF CLINICAL NURSING THEORY (1967)

CHAPTER II

REVIEW OF THE LITERATURE

According to Polit and Hunger (1999), researchers often undertake a literature review to familiarize themselves with the knowledge base. The term literature review refers to the activities involved in identifying and searching for the information on a topic and developing an understanding of the state of knowledge on that topic, the term is also problem. The available literature and studies are organised under the following headings.

I. Literature related to Catheter Associated Urinary Tract Infection.

II. Literature related to Bacteriuria

III. Literature related to Bacteriuria and Distilled Vinegar.

I. Literature related to Catheter Associated Urinary Tract Infection

Zieve David, (2010). A Catheter Associated Urinary Tract Infection is an infection that occurs in someone who has a tube (called a catheter) in place to drain urine from the body.

Causes

Having a catheter within the urinary tract, the chances of urinary tract infection is more. It may also make it harder to treat the infection. If a urinary catheter is left in place for a long time, bacteria will grow in it. A harmful infection may occur if the number of bacteria becomes large or if specific harmful bacteria grow in the urinary tract. Most Catheter-Associated Urinary Tract Infection are caused by bacteria. However, the fungus Candida may cause infections of the urinary tract.

Symptoms

- Abnormal urine colour (cloudy urine)
- Blood in urine (hematuria)

- Foul or strong urine odor
- Frequent urge to urinate
- Leakage of urine around the catheter

Often in an elderly person, mental changes or confusion are the only signs of a possible Urinary Tract Infection.

Exams and Tests

The health care provider will perform a physical exam. Urine tests are done to check for infection:

- Urinalysis may show White Blood Cells (WBCs) or Red Blood Cells (RBCs).
- Urine culture can help determine the type of bacteria in the urine and the appropriate antibiotic treatment.

Chenoweth CE, Saint S, (2010). Catheter-associated urinary tract infections (CAUTIs) account for approximately 40% of all health care-associated infections. Despite studies showing benefit of interventions for prevention of CAUTI, proper aseptic practices for catheter insertion and maintenance and use of a closed catheter collection system are essential for preventing CAUTI. The use of antimicrobial catheters also may be considered when the rates of CAUTI remain persistently high despite adherence to other evidence-based practices, or in patients deemed to be at high risk for CAUTI or its complications.

Wenger Joyce, (2010). conducted a study on cultivating qualities to reduce rates of Catheter Associated Urinary Tract Infection. This study results suggests that the following interventions reduce the incidence of Catheter Associated Urinary Tract Infection in patients managed by short-term indwelling catheterization (1) staff education

about catheter management, combined with regular monitoring of CAUTI incidence (2) a facility-wide program to ensure catheterization only when indicated and prompt removal of indwelling catheters (3) daily cleansing of the urethral meatus using soap and water or perineal cleanser and (4) maintenance of a closed urinary drainage system. Mixed evidence suggests that use of a preconnected system reduces inadvertent interruption of a closed urinary drainage system and may prevent Catheter Associated Urinary Tract Infection. Limited evidence suggests that routine catheter changes every 4 to 6 weeks reduce Catheter Associated Urinary Tract Infection incidence in patients managed by long-term catheterization. Existed evidence suggests that the following interventions are effective for reducing Catheter Associated Urinary Tract Infection incidence: (1) use of sterile technique for catheter insertion, (2) use of antiseptic solutions or ointments during routine meatal care, (3) use of a 2-chambered urinary drainage bag, (4) use of antiseptic filters incorporated into a urinary drainage bag, (5) bladder or catheter irrigation, (6) frequent changes of the urinary drainage bag, and (7) placement of an antiseptic solution in the urinary drainage bag.

Parker. (2009) stated regarding the catheter management practices that have no support from clinical research. These practices include instilling antibiotics or other additives to the drainage bag, applying antiseptic compounds to the meatus, and using specific agents for meatal cleansing. In addition, systemic antibiotics should not be used routinely to prevent CAUTI in patients requiring short- or long-term catheterization. And, although cranberry juice may be beneficial for preventing urinary tract infections in non catheterized patients, there is no evidence to suggest that cranberry juice reduces the risk of CAUTI.

Garibaldi, Richard A, (2008). conducted a study on Urinary tract infection associated with the use of an indwelling urethral catheter, which is the most frequent cause of nosocomial infection. Between 10% and 20% of patients develop bacteriuria during a 2- to 4-day period of catheterization. Most episodes of bacteriuria occur when enteric bacteria colonizing the periurethral area migrate retrogradely into the bladder along the outside of the catheter in the periurethral mucus sheath. Some species of bacteria are uniquely capable of adhering to catheter materials and forming encrustations that can seed bladder urine and obstruct urine flow. Strategies to prevent catheter-associated urinary tract infection have been designed to interrupt the chain of infection. Unfortunately, none have been successful in significantly lowering infection rates. Investigations are ongoing for new catheter materials and agents that prevent the adherence of bacteria to the catheter or bladder epithelium. Until these products are available, the best strategies to prevent infection are closed, sterile catheter care.

Holliman, (2008). done a controlled prospective trial on the use of peroxide disinfection on drainage bags as the only measure taken to affect the rate of hospital acquired Urinary Tract infection. The study was conducted on Catheterized patients in Orthopaedic wards. A significant reduction ($P<0.05$) in the number of patients with Catheter which was disinfected when compared with patients in whom this technique was not used. This study concluded that, this technique to be suitable for the management of Catheter patients on general hospital wards to reduce Catheter Associated Urinary Tract Infection and environment spread of bacteria.

Sign, (2006). stated that even when nurses apply best practice insertion and indwelling care, all patients with an indwelling catheter will have bacteria presents as the

catheter provides a focus for bio film formation .UTI is the most common hospital acquired infection and majority are associated with catheters.

Ronald, (2002). stated that aging is associated with an increased susceptibility to UTI, in part because of the increased incidence of obstructive uropathy in men and alteration from periurethral flora from menopause in women. Other causes include incontinence, increased instrumentation and Bladder catheterization.

McCue, (2002). stated that for women and men between 36-65 years of age catheterization and surgery are relevant risk factors. For patients older than 65 years, the incidence of Urinary Tract Infection continues to increase in both sexes .Incontinence and chronic use of Urinary Catheters is important risk factors in these patients. The morbidity and mortality of Urinary Tract Infection are the greatest

Tambyah, (2000) conducted a prospective study of Catheterized patients to define the clinical features of Catheter Associated Urinary Tract Infection. The sample size was 1497 newly catheterized patients in University hospital, USA. Every day, a quantitative urine culture and urine leukocyte count was obtained, and the patient was queried by a research worker regarding symptoms. There were 235 new cases of nosocomial Catheter Associated Urinary Tract Infection during the study period. More than 90% of the infected patients were asymptomatic. Only 123 infections (52%) were detected by patient's physicians using the hospital laboratory. In the subset analysis, there were no significant differences between patients with and without Catheter Associated Urinary Tract Infection.

Tambyah PA, Halvorson KT, Maki DG, (1999). conducted a prospective study to determine the pathogenesis of catheter-associated urinary tract infection, In this study he assumed that With intraluminal Catheter Associated Urinary Tract Infection, caused by micro organisms gaining access to the catheter lumen because of failure of closed drainage or contamination of collection bag urine, the organisms would be detected first or in far larger numbers in a collection bag specimen. Catheter Associated Urinary Tract Infection caused by gram-positive cocci (enterococci and staphylococci) and yeasts were far more likely to be extraluminally acquired (extraluminal:intraluminal, 2.9) than were gram-negative bacilli, which caused Catheter Associated Urinary Tract Infection by both routes equally (extraluminal: intraluminal, 1.2; P = 0.007). Surprisingly, no significant differences were noted in pathogenic mechanisms between men and women. Strategies for prevention of Catheter Associated Urinary Tract Infection must focus on new technologies to prevent access of organisms by all possible routes.

II. Literature related to Bacteriuria

Madeo & Roodhouse, (2009). stated that, Bacteria that cause CAUTI can gain entry into the bladder via two pathways: the periurethral pathway and the intraluminal pathway. Bacteria following the periurethral route move into the bladder between the outside of the catheter and the inner side of the urethral wall. Bacteria following the intraluminal route, likely the most common route, move upward inside the catheter drainage system after contamination of the drainage bag through the outflow tap or disconnection of the catheter.

Healthcare Infection Control Practices Advisory Committee, (2009). conducted a broad survey in US hospitals, and found that urinary tract infections made up

the highest number of infections (> 560,000) compared to other HAIs, and attributable deaths from UTI were estimated to be over 13,000 (mortality rate 2.3%). And while fewer than 5% of bacteriuric cases develop bacteremia, and is the leading cause of secondary nosocomial bloodstream infections. About 17% of hospital-acquired bacteremias are from a urinary source, with an associated mortality of approximately 10%. In the nursing home setting, bacteremias are most commonly caused by Urinary Tract Infections, the majority of which are catheter related.

Sanjay Saint, (2008). conducted a individual trials and meta-analysis which focused primarily on the surrogate outcome of bacteriuria. However, low-level growth from a catheterized specimen (i.e., 10^2 colony forming units (CFU) /mL) usually progresses within days to concentrations of greater than 10^4 CFU/mL unless antibiotic therapy is given. Unfortunately, none of the studies was adequately powered to detect a significant difference in the clinically more important outcomes of catheter-related bacteremia or death. Though bacteriuria is a surrogate endpoint, it is probably appropriate to use since it is a component of the only causal pathway in the disease process between catheterization and an important clinical outcome like symptomatic UTI or catheter-related.

Schaeffer, Johnson, (2008) conducted a study on efficacy of trichloroisocyanuric into the urinary drainage bag in the prevention of Catheter Associated Bacteriuria in prospective and randomized trial of 74 patient. Bacteriuria was documented in 27 of the 74 patients. There was a significant difference in the attack rates with 11 of 48 patients in the test group and 18 of 33 in the control group having bacteriuria respectively. Trichloroisocyanuric acid significantly reduced drainage bag contamination.

Gillespie WA, Simpson RA, Jones JE, (2008). conducted a randomized, prospective, controlled study among male patients with indwelling Urinary catheters, to assess value of adding chlorhexidine to urine drainage bags. Chlorhexidine kept the contents of all drainage bags sterile, but the frequency of urinary infection in the chlordexidine group (51%) did not differ significantly from that in the control group (45%). Most infections were endogenous, caused by organisms which probably came from the patient's own urethra. It was concluded that the method has no value in urology units, where standards of catheter care and closed drainage are properly maintained. Controlled studies in other types of catheterised patients are needed, especially when the risks of cross-infection are high.

Nicolle LE, (2005). Indwelling urinary catheters were used frequently in older populations. For either short- or long-term catheters, the infection rate is about 5% per day. Escherichia coli remain the most common infecting organism. Urinary Tract Infection usually follows formation of bio film on both the internal and external catheter surface. The bio film protects organisms from both antimicrobials and the host immune response. Morbidity from UTI with short-term catheter use is limited if appropriate catheter care is practised. Long-term care facility residents with chronic indwelling catheters have a much greater risk for bacteraemia and other urinary complications than residents without catheters. Prevention of catheter-acquired UTI and its complications is a major goal. Maintaining a closed drainage system and adhering to appropriate catheter care techniques will also limit infection and complications. The major focus of future advances in prevention of catheter-acquired UTI is the development of biomaterials resistant to bio film formation.

Hartman and Hartman, (2003). indicated in his literature that persistent, irreversible urinary incontinence may affect an estimated 50% of patients in tertiary care settings. However, patients who have an indwelling urinary catheter show a high incidence of urinary tract infection demonstrated by numerous research studies. The catheterized urinary tract has been demonstrated to account for most nosocomial urinary tract infections with resulting bacteriuria. Not withstanding, long-term urethral catheter-associated bacteriuria is said to be the most common nosocomial infection in secondary and tertiary care settings, as well as in home health care environments. Research studies have indicated that about 40% of all nosocomial infections in the United States are associated with the urinary tract, of which 75% are related directly to indwelling catheterization. Bacteriuria has been demonstrated as a universal consequence of urethral catheterization.

Savas, Duran, (2002) conducted a study to determine the micro organisms responsible for Urinary Tract Infection, and the risk factors of nosocomial Urinary Tract Infection. This was a prospective surveillance study including cases of Nosocomial Urinary Tract Infection in various inpatient clinics and Intensive care units. In this study, 618(2.1) nosocomial infections were determined and 178 of these were Nosocomial Urinary Tract Infection.

III. Literature related to Bacteriuria and distilled vinegar

The regular use of vinegar as a disinfectant can be traced at least as far back as ancient Roman times. Wherever they went, soldiers in the Roman regions would add vinegar to disinfect their drinking water. During the middle ages people used vinegar as a disinfectant to help combat many diseases including the dreaded bubonic plague.

Throughout the American civil war and right up to the First World War, soldiers used apple cider vinegar as a disinfectant to clean and disinfect wounds.

Yu-Chu Chung, (2011) conducted a study to evaluate the effect of rice vinegar administered via nasogastric feeding tube on catheter-associated bacteriuria in patients with long-term urinary catheterization. The authors conducted a randomized controlled trial (n = 60) to compare treatment with dilute vinegar and usual care. The authors recruited patients catheters from a long-term care facility in northern Taiwan. The experimental group received 100 ml of diluted rice vinegar each day, whereas the control group received 100 ml of water. The result findings showed significant between-group differences in urinary pH, bacterial titre, and turbidity. No patient in the experimental group, but three in the control group, exhibited symptomatic urinary tract infection (UTI). Rice vinegar may decrease bacteriuria.

Andrew Copley, (2010). Described that bed bag is larger and hung from the bed. Each type must be drained every eight hours or when full. They should be cleaned and checked for leaks regularly.

1. Wash your hands with soap and water, then drain the bag and place it on a towel.
2. Gently remove the catheter from the bag. Using an alcohol pad, clean the end of the catheter tube; attach a new bag to the catheter.
3. Mix three parts water and two parts vinegar in the container. You may substitute bleach for vinegar.
4. Make sure the drain spout is closed and fill the bag with the solution. Let it stand for twenty minutes, and then drain it fully.

5. Gently wipe the outside of the bag using a clean cloth with soap and water. Rinse the bag with clean water, being careful not to get any inside the bag.
6. Hang upside down securely in a safe place to fully air dry. Wash your hands thoroughly.

The American society of microbiology, (2006). stated that according to the researches solution of vinegar and regular household bleach could be used, on bacterial spores dried onto surfaces are considered the most resistant to disinfectants of all microbes, and a disinfectant that can kill such spoors would be expected to also kill all types of vegetative bacteria, fungi, mycobacteria, TB, and viruses.

Washington Eric, (2005). stated that the use of an indwelling catheter has been frequently associated with acute bacteriuria, regardless of strict adherence to urinary catheter care guidelines. The use of antibiotic bladder irrigation has been found to reduce the incidence of infection, but also shown to lead to the emergence of resistant organisms. Finally, while numerous researchers have attempted to reduce bacterial colonization within the collection bag by the instillation of various solutions, no researched agent or method has been shown to be effective in reducing the incidence of bacterial propagation within the catheter drainage bag. . More particularly, the method decreases catheter-associated bacteriuria in a catheterized patient by the steps of instilling a sterile acetic acid solution (e.g., distilled vinegar) into the catheter drainage bag, dispersing the solution in the bag.

Nash, (2003) conducted a recent review of the literature on self-cleaning of catheter draining bags, She recommends adhering to the findings of a clinical trial in

which the daily cleansing of both night time and leg drainage bags with 1:10 household bleach solution extended the use of the urinary drainage bags from 1 week to 1 month without any significant increase in urine or drainage bag colonization in rate of urinary infection. One study was found that compared distilled white vinegar and 3% hydrogen peroxide irrigation of catheter bags in a sample of 20 patients. The study showed that patients whose bags were irrigated with vinegar showed a significant reduction of bacteriuria compared with patients whose bags were irrigated with the hydrogen peroxide solutions.

Washington EA, (2001). conducted a research study on reducing the development of bacteriuria which focused on the propagation of bacteria within the catheter and drainage bag Patients with indwelling catheters acquire urinary tract infections at a rate of 5% per day. After 30 days of catheterization, there is a 78% to 95% incidence of bacteriuria, despite the use of meticulous catheter care. This research proposal sought to determine the effects of instillation of 3% hydrogen peroxide versus distilled vinegar in urethral catheter drainage bags to decrease bacteriuria in 20 long-term catheterized patients. Baseline urine cultures for control and test mediums showed no significant difference in rates of bacteriuria. However, urine cultures obtained at the 48-hour interval showed significant reduction in bacteriuria in urinary bags irrigated with vinegar The implications in this study for nursing practice include a need for further research using a larger number of subjects and a need for improvements in the design of the catheter drainage system.

Hartman Domenica, (2001). indicated that the distilled vinegar group had significantly fewer colonies of bacteria than the control group at forty-eight hours after

instillation. There was no statistically significant difference between the hydrogen peroxide and distilled vinegar groups (analysis of variance, P=0.03 and P=0.006 with regard to types of micro organisms and aggregate colony counts, respectively). Nevertheless, the results of comparative performance of hydrogen peroxide and distilled vinegar shows a strong correlation between instillation of distilled vinegar and decreased bacteriuria. While both irrigation solutions decreased bacterial contamination of the urinary drainage bag when compared to the control group, results obtained from the forty-eight-hour collection interval evidenced that the distilled vinegar group exhibited a significant reduction in drainage bag bacteriuria as compared to the hydrogen peroxide group, at a level of 0.0059 by analysis of variance.

Tamara Runzel, (2000) stated in his article that some experts recommended to clean the drainage bag periodically. Cleanse and deodorize the drainage bag by filling the bag with two parts vinegar and three parts water. You can substitute chlorine bleach for the vinegar and water mixture. Let this solution soak for 20 minutes. Hang the bag with the outlet valve open to drain and dry the bag.

CHAPTER-III

RESEARCH METHODOLOGY

Research methodology includes Research approach, Research design, Variables, Description of setting, Population, Sampling, Criteria for sample selection. It further deals with Description of tool, Content validity, Reliability, Pilot study and method of data collection.

Research Approach

An evaluative approach was considered as an appropriate research approach to evaluate the effectiveness of distilled vinegar on level of bacteriuria.

Research Design

The Research Design used in this study was True Experimental post test only design.

RE X O

RC O

R - Randomization of the subjects

E - Experimental Group

C - Control Group

X - Manipulation of Independent Variable (Disinfection of Urinary Drainage Bag with Distilled Vinegar.

O - Assessment of Clinical Signs and symptoms of Bacteriuria, Urinalysis and Urine Culture.

Variables

Independent Variable: Distilled Vinegar disinfection of Urinary Drainage Bag.

Dependent Variable : Level of Bacteriuria.

Description of Setting

The study was conducted in ICU and Post Operative wards of Pius Hospital, Nithravilai at Kanya Kumari Dist. It is a 150 bedded hospital which is located about 350 km away from Sara Nursing College, Dharapuram. Of that there is an average of 10 to 15 patients were there on Urinary Catheterization per day.

Population

The target population of the study was Urinary Catheterized patients

Sampling

Sample

The sample of this study was patients on Urinary Catheter between 20 to 80 years of age who were admitted in Pius Hospital during the study period and those who met the inclusion criteria.

Sample Size

The sample size was 60. Among them 30 were in Experimental group and 30 in Control group.

Sampling Technique

Simple Random Sampling Technique through lottery method was used in this study. Among the samples selected, 30 each were randomly assigned in experimental and control group by lots.

Criteria for Sample Selection

The sample was selected based on the following inclusion and exclusion criteria

Inclusion Criteria

- Patients who is on Indwelling Urinary catheter.
- Patients with age group between 20-80 years.
- Both Males and Females.

Exclusion Criteria

- Patients with history of Urinary Tract anomalies.
- Patients with temporary Urinary Catheterization
- Patient who are not willing to participate.

Description of the tool

The tool consists of three sections.

Section – I: Demographic Profile

A Structured interview schedule was used to assess the demographic data like age, Sex, Education, occupation, Duration of Catheter in Site, Indication for Catheterization. No score was allotted for this section and it was used for descriptive analysis

Section –II: Check list to assess the clinical signs and symptoms of Bacteriuria.

It includes 10 clinical signs and symptoms of Bacteriuria. A score of 1 was given if symptoms present and zero was given if it is not present. So the total possible score was 10.

Section – III: Urine Analysis and Culture

It consists of seven variables which is concerned with bacteriuria like Leucocyte, Nitrite, Pus cell, Casts, Specific Gravity, P^{H} and Urine Culture. The scoring was given as below.

SL. NO	VARIABLES	VALUES	SCORE
1.	Leucocyte	Negative	0
		Positive	1
2.	Nitrite	Negative	0
		Positive	1
3.	Pus cells	Upto 10/HPF	0
		>10/HPF	1
4.	Casts	No casts and hyaline	0
		Granular casts and RBCs0	1
5.	Specific gravity	1.002-1.030	0
		>1.030	1
6.	P^{H}	5-7	0
		>7	1
	URINE CULTURE		
5.	> 1,00,000		4
6.	10,000- 99,999		2
7.	< 10,000		0
		TOTAL	**10**

The scores of each subjects in section I and section II was added together. The total possible score was 20 and it was interpreted as follows

Total score: 20

0-1	:	No infection
2-7	:	Mild infection
8-13	:	Moderate Infection
14-20	:	Severe Infection

Content Validity

Content validity of the tool was obtained on the basis of opinion of Medical Surgical experts (4 Medical Surgical Nursing specialist, 1 Medical expert). The suggestions given were incorporated.

Reliability

To ensure the reliability of the tool, it has been administered to 6 patients with Urinary Drainage bag. The reliability to assess the Clinical signs and symptoms of bacteriuria was established using interrater method. The reliability coefficient r= 0.91. Hence the tool was reliable and it was used for this study.

Pilot Study

In order to find out feasibility and practicability, a pilot study was conducted at Dr.JMJ Latha Hospital, Swamiarmadam, Kanya Kumari District for a period of 1 week (16.06.2011 to 23.06.2011) among 6 patients with Urinary drainage bag. The study was found feasible to conduct.

Method of data collection

Ethical consideration

Formal permission was obtained from the Medical Superintendent of Pius Hospital, Nithravilai, Kanyakumari District. Oral consent of each subject was obtained before data collection. Assurance was given to the subjects regarding the confidentiality of the data collected and anonymity was maintained throughout the study.

Period of data collection

Data collection was done over a period of 4 weeks from 29.06.2011 to 28.07.2011.

Data Collection Procedure

The data collection was done at Pius Hospital, Kanyakumari District. Permission was obtained before data collection. The objectives of the study were explained to the medical officer and other professionals to get their cooperation during the procedure. Oral consent was obtained. 60 subjects were selected on the basis of Simple Random Sampling Technique using lottery method. In which 30 of them were assigned to experimental group and 30 of them assigned to control group on the basis of randomization (lottery). For the subjects who were assigned for experimental group, the urinary drainage bag was disinfected with distilled vinegar. The disinfection was done two times a day (morning and evening) when emptying the bag. The amount of distilled vinegar was used as per the quantity of urine emptied and the presence of sediments. The criteria for the quantity of distilled vinegar for disinfection is as follows.

<100 ml of urine - 50 ml of distilled vinegar

100- 250ml of urine - 75ml of distilled vinegar

251-500ml of urine - 100ml of distilled vinegar

>500 ml of urine - 125ml of distilled vinegar

On presence of sediments an extra 25ml of distilled vinegar was used.

On the fifth day of intervention Clinical signs and symptoms of bacteriuria and urinalysis and culture were done to find out the level of bacteriuria. For the control group no intervention was given but the level of bacteriuria was measured on the fifth day.

Plan for Data Analysis

Descriptive statistics was used for categorical data. Independent ‘t’ test was used to determine the effectiveness of distilled vinegar and Chi-square test was used to associate the level of bacteriuria with selected demographic variables.

CHAPTER IV

ANALYSIS AND INTERPRETATION

Analysis is a method of rendering data in quantitative and meaningful manner, so that research problem can be studied and tested and the relationship between the variables can be found. It is presented in five sections.

Analysis of data involves a number of closely related operations, performed with the purpose of summarizing the collected data. In this chapter data collected were systematically processed, tabulated and made suitable for analysis and interpretation. Samples of 60 patients with Urinary catheter, 30 in experimental group and 30 in control group were selected and intervention was given. The results obtained were classified and tabulated and the following analyses were performed in fulfilling the objectives of the study. It is presented in five sections:

SECTION A : Distribution of subjects according to their demographic variables.

SECTION B : Assessment of level of bacteriuria among patients with Urinary Drainage Bag in experimental group and control group.

SECTION C : Effectiveness of distilled vinegar used to disinfect Urinary Drainage Bag on level of bacteriuria among Urinary Catheterized patients.

SECTION D : Association between the level of bacteriuria among urinary catheterized patients of experimental group and their demographic variables.

SECTION E : Association between the level of bacteriuria among Urinary Catheterized patients of control group and their demographic variables.

SECTION A

Table 4.1: Distribution of subjects according to their demographic variables

n=60

SL. NO	DEMOGRAPHIC VARIABLES		EXPERIMENTAL GROUP n=30		CONTROL GROUP n=30		TOTAL n=60	
			F	%	F	%	f	%
1.	**Age**	20-35 years	12	40	4	13.33	16	26.67
		36-50 years	11	36.67	9	30	20	33.33
		51-65 years	5	16.67	10	33.33	15	25
		66-80 years	2	6.67	7	23.33	9	15
2.	**Gender**	Male	18	60	15	50	33	55
		Female	12	40	15	50	27	45
3.	**Education**	No formal education	-	-	-	-	2	0
		Primary education	-	-	2	6.67	2	3.33
		High school	2	6.67	-	-	18	3.33
		Higher Secondary	8	26,67	10	33.33	38	30
		Graduate	20	66.67	18	60		63.33
4.	**Occupation**	Home maker	7	23.33	9	30	16	26.67
		Daily wage labourer	6	20	3	10	9	15
		Technical workers	10	33.33	9	30	19	31.67
		Professional workers	7	23.33	9	30	16	26.67
5.	**Duration of catheter in site**	1-5 days	27	90	28	93.33	55	91.67
		> 5 days	3	10	2	6.67	5	8.33
6.	**Indication**	Monitor urine output	-	-	-	-	-	-
		Urinary retention	4	13.33	4	13.33	8	13.33
		Urinary Incontinence	4	13.33	5	16.67	9	15
		Post operative	22	73.33	19	63.33	41	68.33
		Neurologic disorders	-	-	2	6.67	2	3.33

Table 4.1. Shows that, in the experimental group 12(40%) of the subjects belongs to the age group of 20- 35 years whereas in the control group one third of the subjects 10(33.33%) were in the age group of 36 to 50 years.

On the basis of gender, 18(60%) subjects were male in the experimental group, whereas in the control group, half of the subjects 15(50%) were male and other half of the subjects were female.

According to the educational status, in the experimental group two third of the subjects 20(66.67%) were graduate whereas in the control group 18(60%) subjects were graduate.

According to their Occupation, one third of the subjects 10(333.33%) were Technical workers in the experimental group whereas in the control group 9(30%) subjects each were Homemakers, Technical workers and Professional workers.

According to the duration of catheter in site, in the experimental group 27(90%) subjects were between 1 to 5 days of Urinary Catheterization whereas in the control group 28(93.33%) were with more than 5 days of Urinary Catheterization.

According to the indication of Catheterization, 22(73.33%) subjects were catheterized for post operative purpose in the experimental group whereas in the control group 19(63.33%) subjects were post operative patients.

SECTION - B

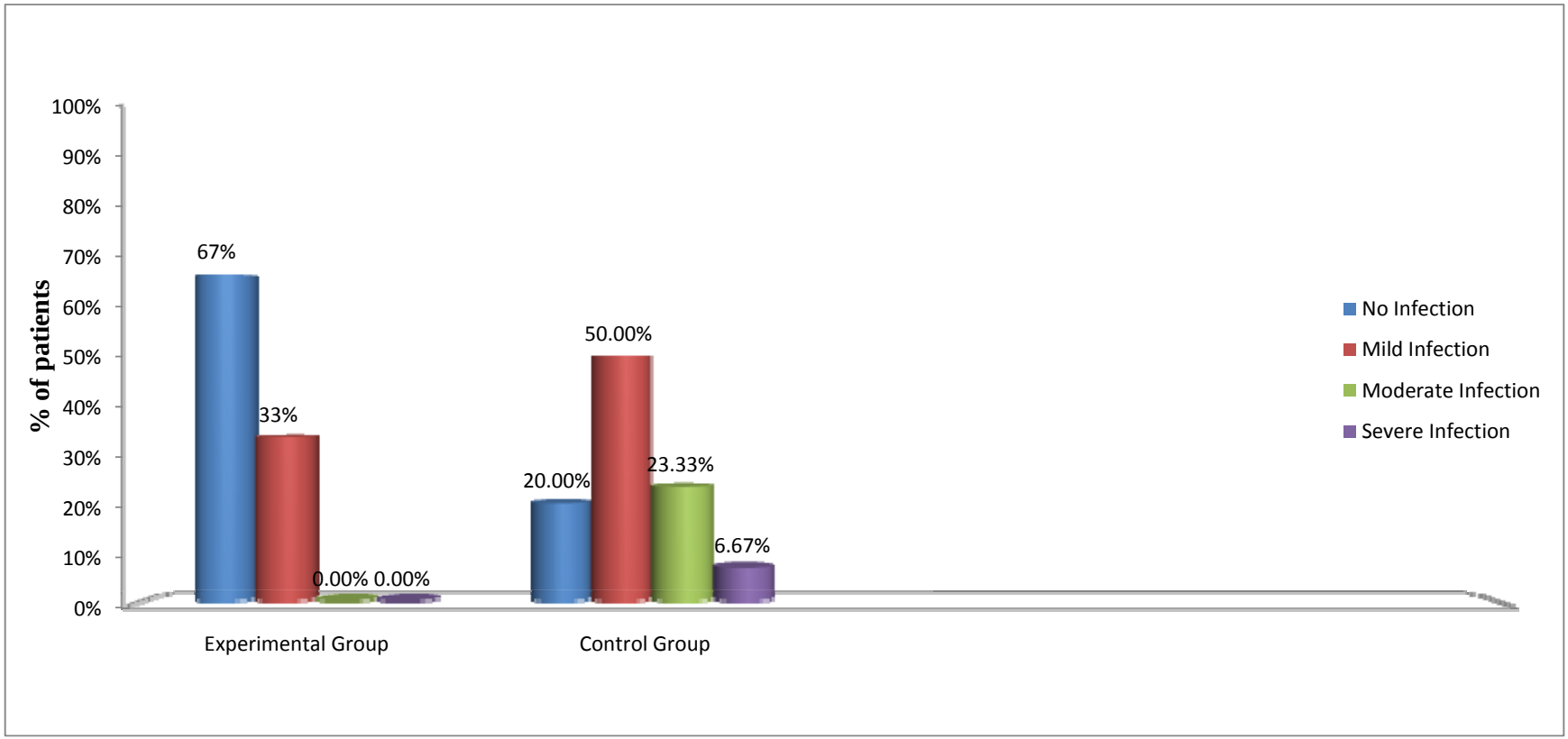

Figure 4.1: Assessment of level of Bacteriuria among patients with Urinary Drainage bag in experimental group and control group

Figure 4.1 shows that, in the experimental group 20(66.66%) subjects have no infection, 10(33.33%) have mild infection and no subjects have moderate or severe infection whereas in the control group 15(50%) subjects have mild infection, 7(23.33%) have moderate infection, 6(20%) have no infection, and 2(6.67%) subjects have severe infection

SECTION - C

Table 4.2: Effectiveness of distilled vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients.

Sl. No	Variables	Max. score	Experimental group		Control group		't' value
			Mean	SD	Mean	SD	
1	Bacteriuria assessment score	20	0.47	0.66	5.03	4.12	2.02*

*($P<0.05$)

Table 4.2: shows that the mean bacteriuria assessment score among experimental group was 0.47(±0.66) where as in the control group it was 5.03(±4.12). The't' value shows that the distilled vinegar disinfection of Urinary Drainage bag has significant effect ($P<0.05$). Hence the H_1 is retained.

SECTION - D

Table 4.3: Association between the level of bacteriuria among Urinary Catheterized patients of experimental group and their demographic variables.

n=30

Sl. No	Demographic variables		Level of bacteriuria				Chi-Square
			No Infection		Mild Infection		
			(f)	(%)	(f)	(f)	
1.	**Age**	20-35 yrs	11	36.66	1	3.33	
		36-50 yrs	6	20	5	16.67	5.93
		51-65 yrs	2	6.67	3	10	
		66- 80 yrs	1	3.33	1	3.33	
2.	**Gender**	Male	14	46.66	4	13.33	2.5
		Female	6	20	6	20	
3.	**Education**	No formal	-	-	-	-	
		Primary	-	-	-	-	
		High school	-	-	2	6.67	4.657
		Higher Secondary	5	16.67	3	10	
		Graduate	15	50	5	16.67	
4.	**Occupation**	Home maker	3	10	4	13.33	
		Daily wage labourer	4	13.33	2	6.67	
		Technical worker	7	23.33	3	10	2.982
		Professional worker	6	20	1	3.33	

5.	**Duration of catheter in situ**	1-5 days >5 days	18 2	60 6.67	9 1	30 3.33	1.667
6.	**Indication for Catheterization**	Monitor urine output Urinary retention Urinary incontinence Post operative Neurologic disorders	- 3 2 15 -	- 10 6.67 50 -	- 1 2 7 -	- 3.33 6.67 23.33 -	0.647

Table 4.3 shows that there was no significant association found between the level of bacteriuria and the selected demographic variables in the experimental group.

SECTION - E

Table 4.4: Association between the level of bacteriuria among Urinary Catheterized patient of control group and their selected demographic variables.

n=30

Sl. No	Demographic Variables		Level of bacteriuria								Chi-Square
			No Infection		Mild Infection		Moderate Infection		Sever Infection		
			(f)	(%)	(f)	(f)	(f)	(%)	(f)	(%)	
1.	Age	20-35 yrs	-	-	3	10	1	3.33	-	-	
		36-50 yrs	1	3.33	4	13.33	2	6.67	2	6.67	
		51-65 yrs	3	10	5	16.67	2	6.67	-	-	4.779
		66- 80 yrs	2	6.67	3	10	2	6.67	-	-	
2.	Gender	Male	1	3.33	12	40	1	3.33	1	3.33	11.62*
		Female	5	16.67	3	10	6	20	1	3.33	
3.	Education	No formal	-	-	-	-	-	-	-	-	
		Primary	-	-	2	6.67	-	-	-	-	
		High school	-	-	3	10	-	-	-	-	21.875*
		Higher Secondary	3	10	-	-	3	10	1	3.33	
		Graduate	3	10	10	33.33	4	13.33	1	3.33	
4.	Occupation	Home maker	4	13.33	1	3.33	3	10	1	3.33	
		Daily wage labourer	-	-	3	10	-	-	-	-	12.295
		Technical worker	-	-	6	20	2	6.67	1	3.33	
		Professional worker	2	6.67	5	16.67	2	6.67	-	-	

5.	**Duration of catheter in situ**	1-5 days >5 days	6 -	1 -	13 2	43.33 6.67	7 -	23.33 -	2 -	6.67 -	2.132
6.	**Indication for Catheterization**	Monitor urine output Urinary retention Urinary incontinence Post operative Neurologic disorders	- 2 - 4 -	- 6.67 - 13.33 -	- 1 2 10 2	- 3.33 6.67 33.33 6.67	- 1 3 3 -	- 3.33 10 10 -	- - - 2 -	- - - 6.67 -	9.821*

*(P<0.05)

Table 4.3: shows that, there is a significant (P<0.05) association found between level of Bacteriuria and Gender, Education and Indication for Catheterization.

CHAPTER – V

RESULTS AND DISCUSSION

This chapter presents the interpretation of the statistical findings. It has been discussed based on the objectives of the study. The aim of the study was to evaluate the effectiveness of Distilled vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients at selected hospital in Kanyakumari district.

A sample of 60 patients with urinary catheterization were enrolled, 30 subjects in experimental group and 30 in control group who met the inclusion criteria were selected for the study by using simple random sampling technique. The tool used for data collection consists of a check list for the assessment of clinical signs and symptoms of bacteriuria and urinalysis and culture to assess the level of bacteriuria.

- **The first objective of the study was to assess the level of bacteriuria among Urinary Catheterized patients after disinfecting with distilled vinegar among experimental group**.

The finding shows that, in the experimental group 66.66(20) percent has no infection, and 33.33(10) has mild infection.

- **The second objective of the study was to assess the level of bacteriuria among urinary catheterized patients in control group**

The finding shows that in the control group 20(6) percent has no infection, 50(15) percent has mild infection, 23.33(7) percent has moderate infection and 6.67(2) has severe infection.

- **The third objective of the study was to evaluate the effectiveness of Distilled Vinegar used to disinfect Urinary Drainage Bag on level of Baceriuria among Urinary Catheterized patients**.

The finding shows that the mean bacteriuria assessment score among experimental group was 0.47(±0.66) where as in the control group it was 5.03(±4.12). The‘t’ value shows that the distilled vinegar disinfection of Urinary Drainage bag is significant effect ($P<0.05$)..

H_1 : There will be a significant difference in the level of bacteriuria among Urinary Catheterized patients between experimental and control group at $P<0.05$ level of significance. Hence the H_1 is retained

This study finding was congruent with the study done by EA Washington on reducing the development of bacteriuria, have focused on the propagation of bacteria within the catheter drainage bag. This research proposal sought to determine the effects of instillation of 3% hydrogen peroxide versus distilled vinegar in urethral catheter drainage bags. Urine cultures obtained at 48-hour interval showed significant reduction in bacteriuria in urinary bags irrigated with vinegar.

- **The fourth objective of the study was to associate the level of bacteriuria with selected demographic variables of experimental group.**

Chi-square analyses was done to find out the association between level of bacteriuria among urinary catheterized patients in experimental group with selected demographic

variables like age, gender, education, occupation, duration of catheter in situ, and indication for catheterization.

There was no significant association found between the level of bacteriuria among the experimental group with their selected demographic variables like age, gender, education, occupation, duration of catheter in situ and indication for catheterization

H_2: There will be a significant association between the level of bacteriuria and the selected demographic variables of experimental group at $P< 0.05$ level of significance. Hence the hypothesis was rejected.

- **The fifth objective of the study was to associate the level of bacteriuria with selected demographic variables of control group**

Chi-square analysis was done to find out the association between the level of bacteriuria among the urinary catheterized patients in the control group with selected demographic variables.

There was a significant association ($P<0.05$) found between the level of bacteriuria among urinary catheterized patient in control with gender, educational status, and Indication for Catheterization.

H_3: There will be a significant association between the level of baceriuria and the selected demographic variables of conrol group at $P<0.05$ level of significance. Hence the hypothesis was accepted.

CHAPTER IV

SUMMARY, CONCLUSION, NURSING IMPLICATION, LIMITATIONS AND RECOMMENDATIONS

This chapter deals with summary of the study findings and its implications for nursing and health care services. It clarifies the implications and recommendations given for different areas like nursing education, nursing practices, and administration for health care delivery system.

The purpose of the study was to evaluate the effectiveness of distilled vinegar used to disinfect Urinary Drainage Bag on level of bacteriuria among Urinary Catheterized patients.

A True experimental post test only design was used in this study. The conceptual framework used in this study was Modified Weidenbach's Helping Art of clinical nursing. Demographic data was assessed using a structured interview schedule. The sample consisted of 60 Urinary Catheterized patients, 30 in the experimental group and 30 in the control group.

The data were analysed using descriptive and inferential statistics. Independent't' test and chi-square was used to test the hypothesis.

Major findings of the study

According to the age, in the experimental group 12(40%) of the subjects belongs to the age group of 20- 35 years whereas in the control group one third of the subjects 10(33.33%) were in the age group of 36 to 50 years.

On the basis of gender, 18(60%) subjects were male in the experimental group, whereas in the control group, half of the subjects 15(50%) were male and other half of the subjects were female.

According to the educational status, in the experimental group two third of the subjects 20(66.67%) were graduate whereas in the control group 18(60%) subjects were graduate.

According to their Occupation, one third of the subjects 10(333.33%) were Technical workers in the experimental group whereas in the control group 9(30%) subjects each were Homemakers, Technical workers and Professional workers.

According to the duration of catheter in site, in the experimental group 27(90%) subjects were between 1 to 5 days of Urinary Catheterization whereas in the control group 28(93.33%) were with more than 5 days of Urinary Catheterization.

According to the indication of Catheterization, 22(73.33%) subjects were catheterized for post operative purpose in the experimental group whereas in the control group 19(63.33%) subjects were post operative patients.

According to the level of bacteriuria, in the experimental group 20(66.66%) subjects have no infection, 10(33.33%) have mild infection and no subjects have moderate or severe infection whereas in the control group 15(50%) subjects have mild infection,

7(23.33%) have moderate infection, 6(20%) have no infection, and 2(6.67%) subjects have severe infection.

According to the effectiveness of distilled vinegar, the mean bacteriuria assessment score among experimental group was 0.47(±0.66) where as in the control group it was 5.03(±4.12). The‘t’ value shows that the distilled vinegar disinfection of Urinary Drainage bag has significant effect ($P<0.05$).

There was no significant association ($P<0.05$) found between the level of bacteriuria among the experimental group with their selected demographic variables like age, gender, education, occupation, duration of catheter in situ and indication for catheterization. There was a significant association ($P<0.05$) was found between the level of bacteriuria among urinary catheterized patient in control with gender, educational status, and Indication of Urinary Catheterization.

CONCLUSION

These findings provided Statistical evidence supporting that the disinfection of distilled vinegar in urinary drainage bag is an effective technique in preventing the level of bacteriuria.

NURSING IMPLICATIONS

Nursing Practice

- Nurses can train the clients as well as the family members to do the disinfection of Urinary Drainage Bag in home setup among clients with chronic Urinary Catheterization.

- Nurses can monitor the Urinary Drainage Bag for the presence of clinical signs and symptoms of Bacteriuria.

Nursing Education

- In service education programs can be conducted regarding the importance of disinfecting urinary drainage bag.
- Nurse educators must take measures to impart knowledge on the use of Distilled vinegar among Catheterized patients

Nursing Administration

- Nurse administrator can make a policy regarding the usage of distilled vinegar disinfection procedure in patients with Urinary Catheter.
- Nurse administrators can also update the treatment protocols by an annual review of microbial flora, which would help in formulation of a rational policy
- Nurse administrator can motivate nursing personnel to conduct such researchers in future.

Recommendations for further researchers

- A similar study can be done on large sample size and in various other settings.
- A comparative study can be carried out by using distilled vinegar vs hydrogen per oxide in disinfecting Urinary Drainage bag.
- A comparative study can be carried out by using distilled vinegar vs savlon solution in disinfecting Urinary Drainage bag

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ANNEXURE – A

SARA NURSING COLLEGE

(Recognised by Govt. of Tamil Nadu, Affiliated to
T.N. Dr. M.G.R. Medical University & Approved by Indian Nursing Council)

Palani Main Road, Manakadavu,
Dharapuram - 638 673, Tirupur District,
Tamil Nadu, South India.

Phone : 04258-244208, Fax : 04258-244254
E-mail : saranursingcollege@gmail.com
website : www.saranursingcollege.com

Date:
Lr.No.SNC.80A/05/11

From,

The Principal,
Sara Nursing college,
Dharapuram.

To,

The Medical Superintendent
Pius Hospital,
Nethaavilai. K.K.Dist

Respected sir,

Ms. V. Anusha Selvin Mary is a bonafide student of Sara Nursing College, Dharapuram, doing her M.Sc(N) Programme in Nursing. She is conducting a research study on

"A Study to evaluate the effectiveness of Distilled vinegar used to disinfect urinary drainage bag in terms of rate of occurrence of bacteriuria among urinary catheterized patients. The research project is to be submitted to "The Tamilnadu Dr. M.G.R Medical University" as a partial fulfillment of the university requirements for the award of M.Sc(N) Degree .The Researcher is anticipating that this project will be beneficial in improving the nursing care among Urinary catheterized patients at your esteemed institution.

As a part of the study she needs to observe the selected subjects in terms of rate of occurrence of bacteriuria and document the collected data for analysis and report.

Hence I request your kind consent for her to conduct the study from June 20th to August 4th at your esteemed Institution. Further details of the proposed project and the outcome will be furnished by the researcher in person. The hospital norms, policies and ethics will be respected and strictly adhered by the researcher throughout the study period.

Thanking You

Principal 03/06/11

PRINCIPAL
Sara Nursing College,
Dharapuram - 638 673.

SARA NURSING COLLEGE
Tirupur Dist
638 673
MANAKADAVU DHARAPURAM

PIUS HOSPITAL

NITHIRAVILAI - 629 154

☎ : 954651 - 242622
242958

Dr. Mrs. D. Gilda Prince, M.B.B.S., M.D., D.G.O.
Consultant obstetrician and Gynecologist
Dr. Prince Pius, B.Sc., M.B.B.S., M.D., (General Medicine)
P.G., Dip Diabetology
Consultant Physician and Diabetologist.

Date : 28.07.2011

To Whom it May Concern,

This is to certify that Ms. **V. Anusha Selvin Mary** has conducted a research on "EFFECTIVENESS OF DISTILLED VINEGAR USED TO DISINFECT URINARY DRAINAGE BAG IN TERMS OF RATE OF OCCURANCE OF BACTERIURIA AMONG URINARY CATHETERIZED PATIENTS" in our hospital from **29-06-2011 to 28-07-2011**

PIUS HOSPITAL Date 28.7.2011 NITHIRAVILAI

Dr. Prince Pius, M.B.B.S, MD
(General medicine, P.G.Dip Diabetology
Consuttant Physician & Diabetalogist.

Dr. Prince Pius, MD.
Reg. No: 47734
PIUS HOSPITAL
NITHIRAVILAI - 629 154

ANNEXURE- B

Tool for Data Collection

Section – I

Structured interview schedule to assess the demographic data

1. Age
    a) 20-35yrs ( )
    b) 36-50yrs ( )
    c) 51-65yrs ( )
    d) 66-80yrs ( )

2. Gender
    a) Male ( )
    b) Female ( )

3. Educational status
    a) No formal education ( )
    b) Primary education ( )
    c) High school ( )
    d) Higher secondary ( )
    e) Graduate ( )

4. Occupation
    a) Home maker ( )
    b) Daily wage labourer ( )
    c) Technical worker ( )
    d) Professional worker ( )

5. Duration of catheter in situ
    a) 1- 5 days ( )
    b) Above 5 days ( )

6. Indication for Catheterization
    a) Monitor Urine Output ( )
    b) Urinary Retention ( )
    c) Urinary Incontinence ( )
    d) Post Operative ( )
    e) Neurologic Disorders ( )

Section – II

Check list for the Assessment of Clinical signs and symptoms of Bacteriuria

Sl.No	Clinical signs and symptoms of Bacteriuria	Present (0)	Not present (1)
1	Increased temperature____^{0}F		
2	Cloudy appearance of urine		
3	Malodorous urine		
4	Presence of blood in urine		
5	Burning pain in urethra		
6	Redness around the urethral meatus		
7	Discharge from the urethra		
8	Supra pubic pain		
9	Flank pain		
10	Leakage of urine around the catheter		
	TOTAL		**10**

Section –III

Urinalysis and Urine culture to assess the presence of Bacteriuria

SL.NO	VARIABLES	VALUES	SCORE
1.	Leucocytes	Negative	0
		Positive	1
2.	Nitrite	Negative	0
		Positive	1
3.	Pus cells	Upto 10/HPF	0
		>10/HPF	1
4.	Casts	No casts and hyaline	0
		Granular casts and RBCs0	1
5.	Specific gravity	1.002-1.030	0
		>1.030	1
6.	Ph	5-7	0
		>7	1
	URINE CULTURE		
5.	> 1,00,000		4
6.	10,000- 99,999		2
7.	< 10,000		0
		TOTAL	**10**

Scoring

Total score: 20

0-1 : No infection

2-7 : Mild infection

8-13 : Moderate Infection

14-20 : Severe Infection

ANNEXURE - C

DISINFECTION OF URINARY DRAINAGE BAG WITH DISTILLED VINEGAR

INTRODUCTION

Urine Drainage Bags connects the catheter tube that is placed inside the bladder. It is easier to clean a Urinary Drainage Bag rather than buying a new one, which could become very expensive. It is imperative to clean the bag carefully in order to prevent infection.

EQUIPMENTS NEEDED

1. Vinegar
2. Boiled Warm water
3. Measuring Cup- 2
4. Gloves
5. Kidney tray

PROCEDURE

- Wash hands well and wear gloves before the procedure
- Monitor the quantity of urine in the drainage bag.
- Mix the cleansing solution as two parts of vinegar with three parts of water
- Empty the Urinary Drainage Bag
- When the bag is empty, clean the end of the spout with gauze or a cotton ball saturated with rubbing alcohol
- Fill the Urinary Drainage Bag with 50 to 150 ml of distilled vinegar as per the amount of urine and sediments in the drainage bag
- Pour the cleansing solution through the top spout and shake it well
- Empty the Urinary Drainage Bag and hang it.

ANNEXURE – D

LETTER REQUESTING SUGGESTION FOR ESTABLISHING CONTENT VALIDITY

From

V. ANUSHA SELVIN MARY,
II year M.Sc(N),
Sara Nursing College,
Dharapuram.

To

Respected Sir / Madam,

Subject : Letter requesting opinion and suggestions from experts for establishing content validity of the tool.

I am a II Year M.Sc (N) Nursing student in Sara Nursing College. As a partial fulfilment of Masters Degree in nursing, I have selected the topic mentioned below for the research project to be submitted to "The Tamil Nadu Dr.M.G.R. Medical University Chennai".

Topic: "A Study to evaluate the effectiveness of Distilled vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients at selected hospital in KanyaKumari district.

Enclosed here with: 1. Proposal
2. Tool

May I request you to kindly validate the following enclosure and give your expert opinion and suggestion for necessary modifications of the tool.

Thanking you in Anticipation

Place: Your's sincerely,
Date: V. Anusha Selvin Mary

ANNEXURE – E

CERTIFICATE OF VALIDATION

This is to Certify that the tool developed by **Ms V. ANUSHA SELVIN MARY,** II year M.Sc(N) of Sara Nursing College On a Topic **"A Study to evaluate the effectiveness of Distilled vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients at selected hospital in KanyaKumari district",** has been validated by the undersigned. The Suggestions and modifications given by me will be incorporated by the investigator in collaboration with their respective guide.

Name: Signature:

Designation:

Date:

ANNEXURE - F

LIST OF EXPERTS

1. Mrs. Radha. K., M.Sc(N)., M.Phil.,

   Asst. Director in Nursing,

   Tamil Nadu State AIDS control Soceity,

   Egmore, Chennai- 8.

2. Mrs. S. Poonguzhali, M.Sc(N)., MA.,

   Reader,

   College of Nursing,

   Madurai Medical College,

   Madurai.

3. Mrs.P.Neela, M.Sc(N).,

   Principal,

   Swami Vivekananda College of Nursing,

   Dharmapuri.

4. Mrs. Geetha, M.Sc(N).,

   Asso. Professor,

   Bishops College of Nursing,

   Dharapuram.

5. Dr. G. Thirumalaisami, MBBS.,DLO.,

   Joint Director,

   Medical Officer,

   Govt. Hospital,

   Dharapuram.

ANNEXURE – G

ENGLISH EDITING CERTIFICATE

I here by certify that, I have edited the work of Ms. **V. ANUSHA SELVIN MARY** II year MSc(N)., student of Sara Nursing college, Dharapuram who is under dessertation work on "A Study to evaluate the effectiveness of Distilled vinegar used to disinfect Urinary Drainage Bag on level of Bacteriuria among Urinary Catheterized patients at selected hospital in KanyaKumari district".

Date:

Signature

S. Saminathan selvaraj,
M.A., M.Ed., M.Phil.,
P.G.Assistant (Economics)
St.Xaviers Higher Secondary School
Puthakudy - 621 111.
Trichy (Dt)

ANNEXURE – H

PHOTOS


URINE BAG